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**SPACE GATEWAY SUPPORT (SGS)** **SGS-33 11 00.00 99 (April 2006)**

**Preparing Activity: SGS-DE** **Superseding SGS-02740J (February 2005)**

**SGS GUIDE SPECIFICATIONS**

**References are NOT in Agreement with UMRL dated 01 April 2006**

**Revised throughout - changes not indicated by CHG tags**
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SECTION TABLE OF CONTENTS

DIVISION 33 - UTILITIES

SECTION 33 11 00.00 99

WATER UTILITY DISTRIBUTION PIPING

**04/06**



-- End of Section Table of Contents --

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SECTION 33 11 00.00 99

WATER UTILITY DISTRIBUTION PIPING
**04/06**

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**NOTE: This guide specification covers the requirements for directional drilling systems, equipment, piping and procedures.**

**Brackets are used in the text to indicate designer choices or locations where text must be supplied by the designer.**
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PART 1 GENERAL

1.1 SUBMITTALS

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**NOTE: Review submittal description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project. Submittals should be kept to the minimum required for adequate quality control. Include a columnar list of appropriate products and tests beneath each submittal description.**

**A "G" following a submittal item indicates that the submittal requires Government approval. Some submittals are already marked with a "G". Only delete an existing "G" if the submittal item is not complex and can be reviewed through the Contractor's Quality Control system. Only add a "G" if the submittal is sufficiently important or complex in context of the project.**

**For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office**

**(Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.**

**Submittal items not designated with a "G" are considered as being for information only for Army projects and for Contractor Quality Control approval for Navy, Air Force, and NASA projects.**

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The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES in sufficient detail to show full compliance with the specification:

SD-02 Shop Drawings

Submit an electronic copy and three hard copies of the record drawings to the Contracting Officer within five days after completing the pull back. The record drawings shall include a plan, profile, and all information recorded during the progress of the work. The record drawings shall be tied to the project's survey control

SD-03 Product Data

Manufacturer's Catalog Data shall be submitted for the polyethylene pipe.

SD-07 Certificates

Submit statement that Contactor has inspected the drill rod and determined that the drill rod is in satisfactory condition for its intended use.

SD-08 Manufacturer's Instructions

Submit a complete list of all drilling fluids, additives, and mixtures to be used along with Material Safety Data Sheets.

SD-11 Closeout Submittals

Submit statement of qualifications and records or previous similar jobs.

Maintain and submit upon completion of work complete logs of guided directional drill operations.

1.2 COMMENCEMENT, DELIVERY, STORAGE, AND HANDLING OF MATERIALS

Prior to commencement of the work, Subcontractor must submit the following to the Engineer of Record for review and approval:

Manufacturer's Catalog Data
Material Safety Data Sheets
statement of qualifications and records

\ Inspect materials delivered to the site for damage. All materials found

during inspection or during the progress of work to have cracks, flaws, surface abrasions, or other defects shall be rejected and removed from the job site.

Disposal of fluids is the responsibility of the Contractor. Disposal of fluids shall be done in a manner that is in compliance with all permits and applicable federal, state, and local regulations. The Contractor may dispose of the drilling fluids on approved land owned by the Government. The drilling slurry shall be spread over the Government-approved disposal area and plowed into the soil.

1.3 QUALIFICATIONS

The Contractor and his field supervisor assigned to this project must be experienced in work of this nature and must have successfully completed similar projects of similar length, pipe type, pipe size, and soil type using directional drilling in the last three (3) years. As part of the bid submission, the Contractor shall submit a description of such project(s) which shall include, at a minimum, a listing of the location(s), date of project(s), owner, pipe type, size installed, length of installation, type, and manufacturer of equipment used, and other information relevant to the successful completion of the project.

1.4 SAFETY

Directional drilling equipment machine safety requirements shall include common grounding system to prevent electrical shock in the event of underground electrical cable strike. The grounding system shall connect all pieces of interconnecting machinery; the drill, mud mixing system, drill power unit, drill rod trailer, operators booth, worker grounding mats, and any other interconnected equipment to a common ground. The drill shall be equipped with an "electrical strike" audible and visual warning system that will notify the system operators of an electrical strike.

PART 2 PRODUCTS

2.1 DRILL ROD

The Contractor shall select the appropriate drill rod to be used. The drill rod shall be inspected and approved for use by the Contractor prior to arrival to the work site.

2.2 PRODUCT

The product pipe to be installed shall be a 10-inch (nominal) diameter polyethylene pipe. The dimensions ratio of the pipe shall be 11 (DR11).

2.3 DRILLING FLUIDS

A high quality bentonite drilling fluid shall be used to ensure hole stability, cuttings transport, bit and electronics cooling, and hole lubrication to reduce drag on the drill pipe and the product pipe. Composition of the fluid must comply with all federal, state, and local environmental regulations.

The bentonite drilling fluid shall be mixed with potable water (of proper pH) to ensure no contamination is introduced into the soil during the drilling, reaming, or pipe installation process. Contractor is responsible for any required pH adjustments.

Disposal of the drilling fluids shall be the responsibility of the Contractor and shall be conducted in compliance with all relative environmental regulations, right-of-way and work space agreements, and permit requirements.

Drilling fluid returns can be collected in the entrance pit, exit pit, or spoils recovery pit. The Contractor shall immediately clean up any drilling fluid spills or overflows from these pits.

## PART 3 EXECUTION

### 3.1 DRILL SET-UP AREA

Contractor shall be responsible for design and construction of the drill entrance and exit pits.

### 3.2 DRILL ENTRANCE AND EXIT PITS

Drill entrance and exit pits are required and shall be maintained at minimum size to allow only the minimum amount of drilling fluid storage prior to transfer to mud recycling or processing system or removal from the site.

Drilling mud shall not be allowed to flow freely on the site or around the entrance or exit pits. Mud spilled shall be removed as soon as possible and the ground restored to origin condition. Pits shall be shored to OSHA Standards.

When drilling near wetlands or water courses, the Contractor shall provide secondary containment to prevent drilling fluids from entering the wetlands approved by the Contracting Officer.

### 3.3 DRILL ENTRANCE AND EXIT ANGLE

Entrance and exit angles can be whatever the Contractor desires such that the elevation profile maintains adequate cover to reduce risk of drilling fluid breakouts and that ground exit occurs as specified herein. Contractor shall be responsible for ensuring that entrance and exit angles ensure pullback forces do not exceed 5 percent strain on the polyethylene pipe.

### 3.4 PILOT HOLE

The type and size of the pilot string cutting head and the diameter of the drill pipe shall be at the Contractor's discretion.

The pilot hole shall be drilled along the path shown on the plan and profile drawings. Pilot hole tolerances are as follows:

a. Vertical Tolerance: Provide minimum cover below channel bottom as specified on the plans. Contractor may go deeper if necessary to prevent breakout.

b. Horizontal Tolerance: +/- 60 inches from the centerline of the product of the product pipe.

c. Curve Radius: No curve will e accepted with a radius less than 1,000 feet.

d. Entry Point Location: The pilot hole entry point shall be within +/- 60 inches of the location shown on the drawings or as directed by the Contracting Officer in the field.

e. Exit Point Location: The exit point location shall be within +/- 60 inches of the location shown on the drawings or as directed by the Contracting Officer in the field.

f. The installed pipeline cover requirements as shown on the drawings or as specified shall not be violated.

3.5 REAMING

Reaming operations shall be conducted at the Contractor's discretion. The type of back reamer to the utilized shall be determined by the type of subsurface soil conditions that are encountered during the pilot hole drilling operation. The reamer type shall be at the Contractor's discretion.

3.6 PULL BACK

The entire pipeline to be installed via direction drill shall be fully assembled prior to commencement of pull back operations.

The pipeline shall be supported during pullback operations in a manner to enable it to move freely and prevent damage. The pipeline shall be installed in one continuous pull.

Torsional stress shall be minimized by using a swivel to connect the pull section to the reaming assembly.

Maximum allowable tensile force imposed on the pull section shall not exceed 90 percent of the pipe manufacturer's safe pull (or tensile) strength. If the pull section is made up of multiple pipe size or materials, the lowest safe pull strength value shall govern and the maximum allowable tensile force shall not exceed 90 percent of this value.

External pressure shall be minimized during installation of the pullback section in the reamed hole. Damaged pipe resulting from external pressure shall be replaced at no cost to the Government. Buoyancy modification shall be at the discretion of the Contractor.

3.7 CONNECTION OF PRODUCT PIPE TO WATER LINE

After the product pipe has been successfully installed, the product pipe will be allowed to recover for 24 hours prior to connection of the water line. The Contractor is responsible for ensuring that a sufficient length of the product pipe has been pulled through the hole so that the pull-nose will not be pulled back into bore hole due to stretch recovery of the product pipe.

3.8 GUIDANCE SYSTEMS

Walkover guidance systems are not acceptable for this project.

A magnetic survey tool location behind the pilot string cutting head and an electric grid (tru-tracker) system shall be used for this project.

## 3.9 DOCUMENTATION

The Contractor shall maintain drilling logs that accurately provide drill bit location (both horizontally and vertically) at least every 2 inches along the drill path. In addition, logs shall be kept that record, as a minimum, the following every 15 minutes throughout each drill pass, back ream pass, or pipe installation pass:

a. Drilling Fluid Pressure
b. Drilling Fluid Flow Rate
c. Drill Thrust Pressure
d. Drill Pullback Pressure
e. Drill Head Torque

The Contracting Officer or Contracting Officer's Representative shall have access to instrumentation, readings, and logs at all times during operation.

## 3.10 UTILITY LOCATES

Contractor shall locate all utilities prior to start of excavation or drilling. The Contractor shall be responsible for damage to utilities and shall repair damaged utilities at no cost to the Government.

## 3.11 CLEANUP AND FINAL CLOSEOUT

Immediately upon completion of work of this section, all rubbish and debris shall be removed from the job site. All construction equipment and implements of service shall be removed and the entire area involved shall be left in a neat condition acceptable of the Contracting Officer.

"Blow holes" or "breakouts" of drilling fluid to the surface shall be cleaned up immediately and the surface area returned to its original condition. All drilling fluids, soils, and separated materials shall be disposed of in compliance with federal, state, and local environmental regulations.

Subcontractor must submit signed and sealed record drawings, and signed final "work complete logs of guided directional drill operations".

-- End of Section --